

THE MARKETING TACTICS USED FOR SELLING ARTIFICIALLY PROCESSED FOOD & ITS IMPACT ON CHILD HEALTH

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ABSTRACT

All children in the age group between 6 months to 59 months admitted in the Pediatric ward of Delhi Hospitals with severe acute malnutrition was included in the study in accordance with the inclusion / exclusion criteria. This Observational descriptive cross sectional study was conducted in the Pediatric ward of Delhi Hospitals. Age of the child was recorded and in case of discrepancies using Birth/ Delivery / Anganwadi / School records in this order. Informed written consent in Hindi language was taken from mothers of these children who were willing to participate in the study and they were explained about purpose of study. Malnutrition among children below five years of age remains a major embarrassment, and impediment to optimal human capital development in India. India is home to the greatest population of severely malnourished children in the world.

KEYWORDS: *Chemically Processed, Food, Organic, Natural, Marketing & Strategy*

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INTRODUCTION

United Nations Children's Fund (UNICEF) estimated malnutrition to be the most common cause of under-five mortality. Diarrhoea and pneumonia account for approximately half the under-five deaths in India, and Malnutrition is believed to contribute to 61% of diarrhoeal deaths and 53% pneumonia deaths. In India NFHS-4 (National Family Health Survey-4) data revealed that Children under 5 years, 38.4% were stunted (height-for-age), 21.0% were wasted (weight-for-height), 7.5% were severely wasted (weight-for-height). 35.7% were underweight (weight-for-age) in total [3]. The WHO and UNICEF proposed diagnostic criteria for severe acute malnutrition in children aged 6 months to 59 months, which includes any of following [4]:-

- Weight for height < 3 standard deviation (SD or Z score) of median WHO growth reference.
- Visible severe wasting.
- Mid arm circumference below 115 mm.
- Bilateral pedal edema (Exclusion of other causes).

Admission criteria [4]: Presence of Anorexia, fever, hypothermia (<35°C), persistent vomiting, severe dehydration, not alert, apathetic, unconsciousness, convulsions, hypoglycaemia, severe anaemia, severe pneumonia or extensive superficial infection. Risk of mortality is increased by 9 times in children with severe acute malnutrition [5]. Median case fatality rates in children under 5 years is approximately 23.5% in SAM which may reach 50% in edematous malnutrition. This fatality rate can be brought down to 7-10% of standard case management protocol [6]. Since malnourished children are especially vulnerable to infections, this combination forms a vicious spiral in

which each condition exacerbates the other [7].

- To study the causes of infection due to chemically processed food and profile of severe acute malnourished children admitted in Delhi Hospitals.
- To know the benefits of organically processed natural food items and marketing strategies to enhance the same.

LITERATURE REVIEW

Malnutrition is a range of pathological conditions arising from coincident lack in varying proportions of protein and calories, occurring most frequently in infant and young children, commonly associated with infections. Description of PEM in the early part of this century paid special attention to dermatological signs and led to the belief that the disease was caused by a tropical parasite or a vitamin deficiency. Protein energy malnutrition is manifested primarily by inadequate dietary intake of protein and energy. The term caloric energy malnutrition was suggested by Jelliffe^[8]. Severe forms are most often called “Marasmus”, “Kwashiorkor” and “Marasmic Kwashiorkor”. The term Kwashiorkor was introduced by Cicely William in 1935, from the local name of disease in Ghana meaning Red Body due to characteristic pigmentary changes^[9]. Kwashiorkor and marasmus are some of the more severe forms of classification of severe acute malnutrition used in community-based therapeutic care. Kwashiorkor is graded as, Grade 1- mild edema on both feet or ankles; Grade 2- moderate edema on both feet, plus lower legs, hands, or lower arms; Grade 3- severe generalized edema affecting both feet, legs, hands, arms, and face. Evidence suggests that long term physical, developmental and cognitive skill and consequently negatively affect school enrolment and increases chances of developing chronic disease^[11, 12, 13]. Many children with PEM do not present with clinical signs and are diagnosed by anthropometry. Children with long standing nutritional deprivation fail to develop normally and may present with different signs and symptom of PEM. Acute or chronic nutritional and emotional deprivation often in combination with underlying diseases leads to severe malnutrition. The WHO and UNICEF proposed diagnostic criteria for severe acute malnutrition [SAM] in children aged 6 months to 59 months which includes any of following [4]:-

- Weight for height < 3 standard deviation (SD or Z score) of median WHO growth reference.
- Visible severe wasting.
- Bilateral pedal edema (exclusion of other causes).
- Mid upper arm circumference below 115 mm.
- The IAP recommended diagnostic criteria (2007) [14] adapted from earlier WHO guidelines are
- Weight for height/ length < -3 SD (WHO/NCHS median height).
- Grossly visible severe wasting.

WHO has defined moderate acute malnutrition as weight for height below -2 standard deviation or Z score and MUAC of 11.5-12.5 cm [4]. Reference standards [10]. The SD score is used in population studies. The percentage of the median is calculated first to interpret data at the population level and Z score is then calculated. Practically, 80% of the reference median for weight for age and weight for height and 90% for height for age correspond to 2 SD below the median

$$\text{Percentage of the median} = \frac{\text{Measured individual value}}{\text{Reference median}} \times 100$$

A prospective study done by Mukesh Chaudhary et al 2015 [37] found Incidence of severe acute malnutrition is 3.28%. Mean age of admitted patients was 14.92 ± 7.48 months and mostly belonged to lower socioeconomic status, rural area and large family. Most of the caretakers were illiterate and in all cases, caretakers were mothers. In this study that 41.3%, 32.1%, 21.3% and 5.3% patients were in PEM grade IV, III, II and I respectively. Female patients were more severely malnourished than males (84.2% v/s 68.21%). Study done by Syed Tariq et al 2015 [38] on Demographic, clinical profile of severe acute malnutrition and our experience of nutrition, rehabilitation centre at children's hospital Srinagar, Kashmir showed that majority children are between 1 to 2 years (39.7%), Male (54.8%) were more severely malnourished. Study by Arya AK et al [39] (2017) on the Hematological profile of children with severe acute malnutrition: a tertiary care center experience also found that SAM were common in between 6-24 months (78.5%) and mean age was 15.4 months. In the study done by Goyal S et al [40] (2017) on cobalamin and folate status in malnourished children showed that Mean age of SAM were 17.25-12.60 months. Study done by Suhas P K et al [41] (2017) on a study of clinical and haematological profile of paediatric patient with protein energy malnutrition showed majority of severe acute malnourished patients were in age group of 4-5 years i.e 42.86% followed by 2-3 years i.e 18.37%. A clinical study by Sandeep B et al [42] (2017) on nutritional status under 5 years of age in correlation with iron deficiency Anemia found that SAM was common in age group of 2-3 years (43.1%). Clinical examination provides clues for assessing the nutritional status as well as the severity of the disease. Jelliffe has classified the clinical signs for easy identification and interpretation.

Place of Study: Department of Pediatrics, Delhi Hospitals

Study Period: June 2016 to May 2018.

Study Design: Observational, Descriptive Cross sectional study

INCLUSION CRITERIA

Children between 6 months to 59 months with Severe Acute Malnutrition newly diagnosed with medical complications admitted in Pediatric ward.

SAMPLE SIZE

According to National Family Health Survey (NFHS 4), Prevalence of severe acute malnutrition is 7.5% in India. [3]

The sample size was calculated using the formula:

$$N = \frac{z^2 (1-p) p}{d^2}$$

Where $p=7.5\%$, which is the Prevalence of severe acute malnutrition

$\alpha=5\%$, the level of significance

$D=5\%$, the allowable error

$$\text{Hence, } N = \frac{(1.96)^2 * 7.5 * 92.5}{5^2}$$

$$= 106$$

However, we have taken SAM with medical complications, the prevalence of which in India is still controversial. Hence, Depending on this data a convenient sample size of 150 taken. First 150 children with severe acute malnutrition with medical complications were included in the study.

SAMPLING METHOD

All children in the age group between 6 months to 59 months admitted in the Pediatric ward of Delhi Hospitals with severe acute malnutrition was included in the study in accordance with the inclusion / exclusion criteria.

The World Health Organization (WHO) proposed diagnostic criteria for severe acute malnutrition in children aged 6 to 59 months include any of the following:

- Weight-for-height less than -3 SD and/or
- Visible severe wasting and/or
- Mid arm circumference (MUAC) < 11.5 cm and/or
- Edema of both feet

METHODOLOGY

This Observational descriptive cross sectional study was conducted in the Pediatric ward of Delhi Hospitals. Age of the child was recorded and in case of discrepancies using Birth/ Delivery /Anganwadi / School records in this order. Informed written consent in Hindi language was taken from mothers of these children who were willing to participate in the study and they were explained about purpose of study. Complete detailed history was recorded, Contact History was recorded. Body weight was recorded with the help of an electronic/ Digital weighing machine with minimal clothing to the nearest of 0.01kg. Height was measured against a non-stretchable tape fixed to a vertical wall with the participant standing on a firm/ level surface to the precision of 0.1cm. Recumbent length (for children <24 months of age) was measured by using infantometer. Children were dressed in light under clothing and without any shoes during the measurement. Each measurement was done twice and mean of the two readings was recorded. The same measuring equipment was used throughout the study. The mid upper arm circumference was measured on the upper left arm to the nearest millimeter at the exact midpoint between the end of the shoulder and the tip of the elbow (olecranon) using a non-stretchable measuring tape issued by UNICEF. The arm was then allowed to hang freely, palm towards the thigh and the measuring tape was placed snugly around the arm at the midpoint mark and the tape was not be pulled too tight. Weight for Length /Weight for Height was calculated using WHO child growth standards. [4]. Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean \pm SD and median. Qualitative variables were correlated using Chi-Square test. A p value of <0.05 was considered statistically significant.

Age Wise Distribution

Table 1: Age Wise Distribution

S. No.	AGE (in months)	Frequency	Percentage
1	<=12months	74	49.33%
2	13-24 months	46	30.67%
3	25-36 months	18	12.00%
4	37-48 months	11	7.33%

Table 1 contd.,			
5	49-59 months	1	0.67%
	Total	150	100.00%

Among the total number of 150 children, 74(49.33%) were in the group of less than 1 year, 46(30.67%) between 13-24 months, 18(12%) between 25-36 months, 11(7.33%) between 37-48 months, 1(0.67%) between 49-59 months. So in this study most of the children presented with SAM were in age group of less than 1 year. Mean age of SAM children is 1.52 ± 1.03 .

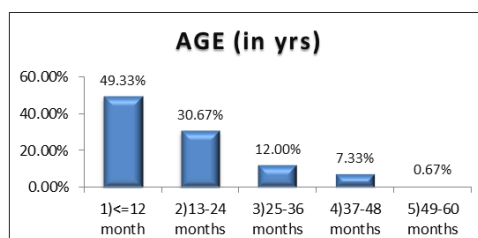


Figure 1: Age Wise Distribution

SEX

Table 2: Sex Distribution

SEX	Frequency	Percentage
Female	77	51.33%
Male	73	48.67%
Total	150	100.00%

Among the total 150 cases enrolled in the study 77 (51.33%) were females and remaining 73 (48.67%) were males. Male to female ratio in this study was 1:1.05.

Age and Sex

Table 3: Age and Sex Distribution

S. No.	AGE (in months)	SEX		Total	P value
		Female	Male		
1	<=12 months	34 (45.95%)	40 (54.05%)	74 (100.00%)	0.597
2	13-24 months	25 (54.35%)	21 (45.65%)	46 (100.00%)	
3	25-36 months	10 (55.56%)	8 (44.44%)	18 (100.00%)	
4	37-48 months	7 (63.64%)	4 (36.36%)	11 (100.00%)	
5	49-59 months	1 (100.00%)	0 (0.00%)	1 (100.00%)	
Total		77 (51.33%)	73 (48.67%)	150 (100.00%)	

$\chi^2=2.7$ df=4

Sex preponderance varies with age group. Less than 1 year there is male dominance and more than 1 year there is female dominated. With an increase in age, there was an increase in female to male ratio. The P value is 0.597 which is statistically insignificant

Weight for Height /Length

Table 4: Weight for Height /Length

	Frequency	Percentage
LESS THAN -3SD	148	98.67%
NORMAL	2	1.33%
Total	150	100.00%

Total subjects having weight for length less than 3SD were 148 (98.67%) in the study group.

Table 5: Weight for Height /Length

MUAC	Frequency	Percentage
>11.5cm	17	11.33%
<11.5cm	133	88.67%
Total	150	100.00%

Complaints

Table 6: Complaints

	Frequency	Percentage
Edema	1	0.67%
Persistent vomiting	76	50.67%
Very weak, apathetic	30	20.00%
Fever (Axillary temperature > 38.5 degree Celsius)	101	67.33%
Children with fast breathing / chest in drawing/ cyanosis	62	41.33%
Extensive skin lesions, eye lesions, post-measles states	6	4.00%
Diarrhea with dehydration based on history and clinical signs	79	52.67%
Severe pallor	12	8.00%
Purpura or bleeding tendency	1	0.67%
Hypothermia (Axillary temperature <35 degree centigrade),shock	9	6.00%
Dysentery	2	1.33%
Seizure	7	4.67%
Failure to gain weight	1	0.67%

Among 150 patients, common clinical presentations in descending order are Fever (67.33%), Diarrhea (52.67%), Vomiting (50.67%), Cough/Fast breathing (41.33%), Weakness (20%), Severe pallor (8%), Hypothermia (6%), Skin lesions (4%), Dysentery (1.33%), Failure to gain weight = bleeding tendency = edema (0.67%).

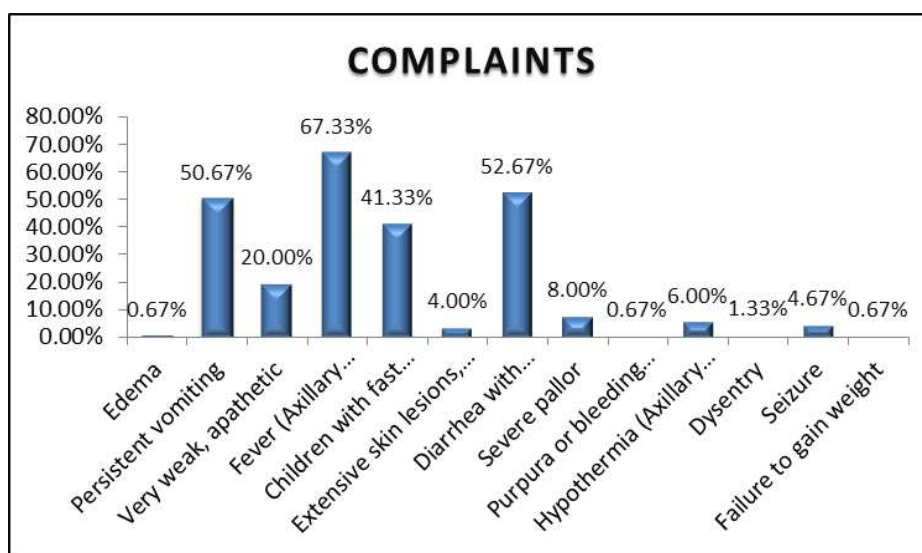


Figure 2: Complaints

Random Blood Sugar

Table 7: Random Blood Sugar

Random Blood Sugar	Frequency	Percentage
Euglycemia	142	94.67%
Hypoglycemia	8	5.33%
Total	150	100.00%

Out of 150 children presented, 8(5.33%) had Hypoglycemia (blood sugar <54mg%)

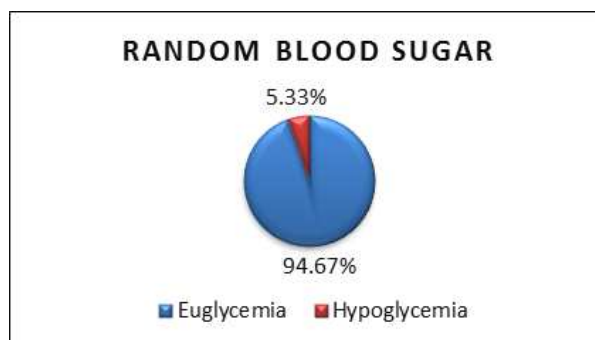


Figure 3: Random Blood Sugar

Haemoglobin

Table 8: Haemoglobin

	Frequency	Percentage
Normal	23	15.33%
Anemic	127	84.67%
Total	150	100.00%

Out of 150 children , 127(84.67%) children had anaemia

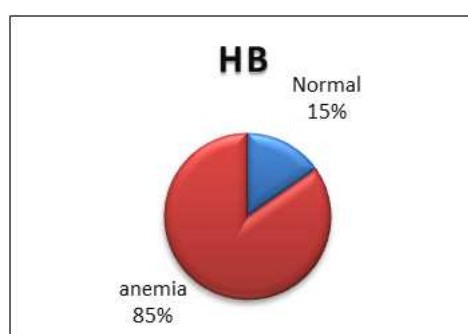


Figure 4: Haemoglobin

Tuberculosis

Contact History

	Frequency	Percentage
Negative	137	91.33%
Positive	13	8.67%
Total	150	100.00%

Out of 150 patients, 13 children(8.67%) had contact with TB

X Ray Chest

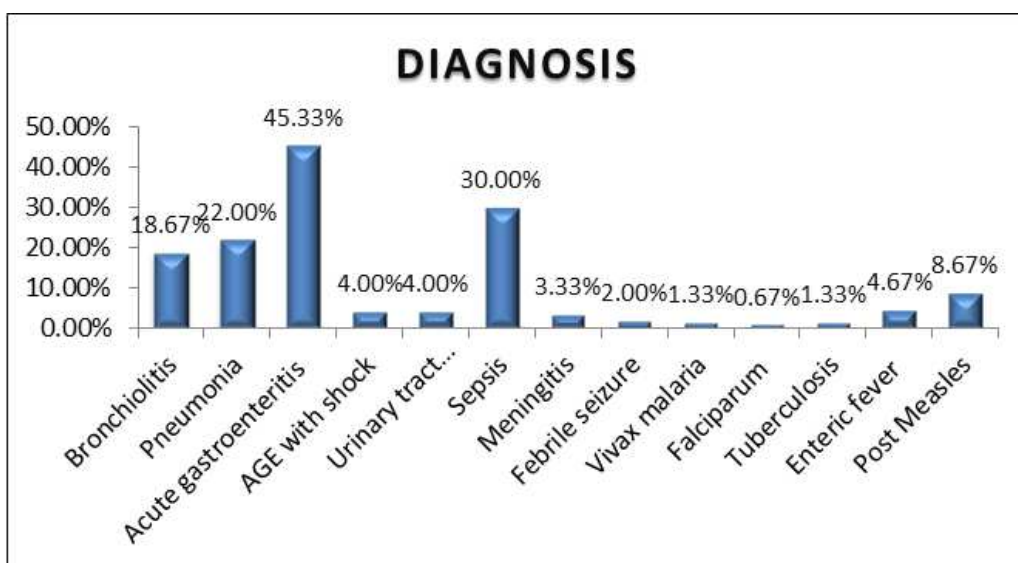
	Frequency	Percentage
Normal	91	60.67%
Abnormal	59	39.33%
Total	150	100.00%

Out of 150 children, 59 (39.33%) had abnormal X ray in form of hyperinflation, homogenous or Non-homogenous opacity.

Diagnosis

	Frequency	Percentage
Bronchiolitis	28	18.67%
Pneumonia	33	22.00%
Acute gastroenteritis	68	45.33%
Acute gastroenteritis with shock	6	4.00%
Urinary tract infection	6	4.00%
Sepsis	45	30.00%
Meningitis	5	3.33%
Febrile seizure	3	2.00%
Vivax malaria	2	1.33%
Falciparum	1	0.67%
TB	2	1.33%
Enteric fever	7	4.67%
Measles	13	8.67%

Diagnosis of 150 patients in descending order based on frequency described below: 74 (49.33%) had Acute gastroenteritis [68 (45.33%) had Acute gastroenteritis+ 6 (4%) had AGE with shock], 61 (40.67%) had Respiratory tract infections [in which 33 (22%) had Pneumonia and 28 (18.67%) had Bronchiolitis], 45 (30%) had Sepsis, 13 (8.67%) had measles, 7 (4.67%) had Enteric fever 6 (4%) had Urinary tract infections 5 (3.33%) had Meningitis 3 (2%) had Malaria [2 (1.33%) had Vivax and 1 (0.67%) had Falciparum] 2 (1.33%) had Tuberculosis



CONCLUSIONS & RECOMMENDATIONS

Globally, more than one third of the child deaths is attributed to under nutrition and it continues to be a major public health problem in developing countries. Our present study was conducted to determine the clinical profile of severe acute malnourished children in a tertiary hospital of Delhi and to study the positive culture isolates associated with severe acute malnutrition. For the present study, 51.33% were females and remaining 48.67% were males. Male to female ratio in this study was 1:1.05 and most of the children presented with SAM are in the age group of less than 1 year. 49.33% were in the group of less than 1 year, 30.67% between 1.1 to 2 years, 12% between 2.1 to 3 years, 7.33% between 3.1 to 4 years, 0.67% between 4.1 to 5 years. The commonest age group were under 24 months, which is consistent with other previous studies Yaikhomba T et al (36) and Arya A K et al (39). In the first 2 years of life, rapid growth occurs and requirement of substrates for energy and building of tissues also increases, thus deficiency of energy, protein and micronutrients often result. Age distribution was consistent with other previous studies Chaudhary et al [37] and Goyal, S et al [40]. It was postulated that due to ritual and social norms, parents give more importance and seek medical advice more often for a male child. However, our study, despite showing Female Sex preponderance which were consistent with other previous studies Chaudhary et al [37] and Sandeep B et al [42].

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